

## **Multimedia, interactivity and learning: some lessons from the United Kingdom**

**Terry Haydn**

School of Education and Lifelong Learning, University of East Anglia, Norwich NR4 7TJ, England

The paper considers what lessons might be learned from the past decade of investment in new technology in education in the United Kingdom. Research in the UK suggests that ICT is not, as many politicians and policy makers have suggested, an unproblematic educational miracle, and a number of studies have pointed to the disappointing returns and uncertain benefits of the massive investment in ICT in UK schools. The paper presents the views of researchers, teachers and teacher educators in the UK on the ways in which multimedia and 'interactive' learning can be provided by new technology in a way that enhances teaching and learning outcomes, and the limitations and negative aspects of some elements of ICT use which teachers have encountered. The outcomes suggest that there is a need for more nuanced thinking, more responsiveness to the needs and voices of teachers, and differential investment in new technology if the potential of ICT in education is to be realised.

**Keywords** multimedia; interactivity; pedagogy; ICT; new technology

### **1. Context**

The past decade has seen unprecedented investment in the use of new technology in UK schools and politicians of all parties have waxed lyrical about the potential of ICT for improving teaching and learning in school subjects. In particular, attention has focused on the multimedia dimensions of new technology and the claims that new technology offers the potential to provide interactive modes of teaching and learning which will be more effective than traditional modes of pedagogy. It is important to keep in mind that not all countries have the same attitude to the use of ICT in education. Whereas some have adopted an enthusiastic espousal of putting large numbers of computers into schools, and seen the technologisation of education as a crucial 'weapon' in terms of international competitiveness in education, others have been more relaxed or restrained in this area, and have not viewed computer to pupil ratios, or quality and quantity of internet connectivity in schools as major factors in educational progress or effectiveness. As Behre noted, 'Most countries in Europe compared to Sweden go easy or very easy in computerising their schools. The question is whether they are so conservative that they have not grasped the idea or whether they are smart, having understood that the school has more important things to do' [1]. This is an area worth researching because in many countries, new technology has become an important part of government thinking about investment and training in education. Nearly all countries face difficult decisions over investment in education. Given that billions of pounds are spent worldwide on educational resources of one sort or another, analysis of the benefits of using ICT in schools, and of the precise ways in which different ICT applications offer advantages in different school subjects is relevant to most education systems, as is the learning of lessons about mistakes which may have been made in the use of ICT in schools. A study of the statements of politicians from all parties in the United Kingdom showed that they have been unequivocally positive about the part that new technology would play in enhancing educational outcomes. It is difficult to find any statement from a UK politician which is in any way sceptical or even equivocal about the potential of ICT to improve learning outcomes [2]. As Heppell was to remark, 'a succession of ministers embraced technology with photogenic relish; when did you last see an education minister without a computer in the background?' [3].

Key facets of ICT which were typically cited by politicians were the advantages of multimedia and the 'interactive' nature of the learning which new technology promoted. Thus Conservative minister John Redwood claimed that 'our children are in no doubt. They are dancing to the tune of cyberspace.... Even French grammar can captivate if it is presented in colour, on screen' [4]. As Labour Party leader, and later as Prime Minister, Tony Blair made a number of speeches extolling the virtues of new technology, and in particular the advantages of 'interactivity': 'The other important thing about CD-ROMs of course is that they are interactive. Learning is no longer a matter of passively receiving information; you can become actively involved in the process yourself, answering quizzes, manipulating images, summoning up pictures or music and pasting together your own notebook of words, images and sounds on screen' [5].

However, a study of the reports of researchers in the UK in the field of ICT and education suggests that the substantial financial investment in new technology has not been unproblematic, and that the use of ICT in the classroom can have negative as well as positive outcomes.

This paper presents the views of some researchers, teachers and teacher educators in the UK on the ways in which multimedia and 'interactive' learning can be provided by new technology in a way that enhances teaching and learning outcomes, and the limitations and negative aspects of some elements of ICT use which teachers have encountered. In addition to citing some UK research in this field, it draws on interviews with over 50 teachers and teacher educators in the UK. The concluding section offers some suggestions for refining ideas about the concepts of multimedia and interactivity, the ways in which they might or might not improve teaching and learning outcomes, and ways forward for improving the effectiveness of ICT use in schools.

## **2. Subject discipline dimensions of ICT use in schools**

Whereas politicians and policymakers have tended to focus on the generic features of ICT for teaching and learning, for those involved in teaching, it is almost self-evident that the benefits of new technology will vary from one subject to another. For example, for the physics teacher, data logging is a crucially important application but it is of no use or interest to teachers of history or geography. Integrated Learning Packages (sometimes termed 'Drill and Skill' software) may work in subjects like maths, but do not appear to have any applicability in the humanities subjects. This was apparent in an interview with a primary teacher (in the UK, primary teachers generally teach all subjects to their pupils): 'The interactivity that the whiteboard offered wasn't that much use when I was teaching humanities subjects; you tended to just use it for showing pictures and a data projector would do that job but for numeracy the interactive whiteboard offered real advantages in terms of doing things with graphs and objects, special concepts, changing positions and sizes of shapes, would be very slow and clumsy, less powerful using flip charts and trying to draw things... I hardly used the interactivity functions at all for history, not much for science but it was invaluable when doing numeracy.'

Whereas for history teachers in England, CD-ROMs have been largely supplanted by use of the internet [6], the facility to use graphic animations and simulations makes them still attractive to teachers of science and geography. In the words of one geography teacher educator, 'For geography, the ability to show simulations of physical change, such as volcanoes erupting, can be done much more powerfully and graphically with CD-ROMs and flash files.... You just couldn't show it as effectively with a blackboard or flipchart', sentiments echoed by a science teacher educator: 'Whereas CD-ROMs might not have taken off in other subjects, in Science education there are some fantastic ones which model physical and chemical processes very clearly, in a way that you just couldn't do with traditional educational media. Flash files from the internet are another example of multimedia resources that give the science teacher a powerful tool.' Teachers of English were more critical of CD-ROMs, and in particular, the hyperlink facility which they offered. As one argued, 'With CD-ROMs it is often difficult to get pupils to stick to or find coherent routes through the material, it can be very hit and miss, and many pupils just lapse into browsing casually without purpose or direction.' Kress points out that with the book, there is in practice only one entry point for the pupil, the first words on the top left hand side of the page, whereas

with webpages and CD-ROMs, there may be as many as 14 possible entry points for learners. This has implications for subjects such as English and History, where narrative is a strong element of the subject discourse [7]. The less positive implications of hyperlinking were also pointed out by Josie Taylor, an academic working for the UK's Open University:

If they (learners) think it is all to do with trial and error, jumping from one thing to another, pressing this button, that button, that's not learning, that's not getting the knowledge into their minds in an integrated way, in a way they can make use of, that's just mucking about [8]

It was apparent, from interviews with teachers that the advantages and possible pitfalls of new technology varied according to what subject was being taught. Although there were a few common strands and concerns, (such as how to use presentation software such as PowerPoint effectively), subject specialists varied in their views on which ICT applications offered most potential for improving teaching and learning in their subject. History teachers were almost alone in their interest in pupil-friendly data handling software (to interrogate census data etc), science teachers were the only group of teachers interested in data logging software. For teachers of English, the audio dimensions of multimedia were of considerable importance, whereas for teachers of physical education, video capture was the most useful element of multimedia. In spite of these perhaps predictable divergences, much of the training and competence frameworks for the use of ICT for teachers and pre-service teachers in the UK has been of a generic nature [9, 10].

### **3. ICT and learning: problems and possibilities deriving from recent experience in the UK**

Several recent surveys in the UK suggest that in spite of the massive financial investment in ICT in education, many teachers still make little or no use of computers in their teaching [11, 12]. In an editorial in the *British Journal of Educational Technology*, Nichol and Watson suggested that 'there is relatively little to show for the major investment of time, resources and human endeavour in educational ICT.... Rarely in the history of education has so much been spent by so many for so long, with so little to show for the blood, sweat and tears expended' [13]. Commenting on the outcomes of the ImpaCT 2 Report [14], an editorial in the Daily Telegraph reported that 'Equipping schools with a million computers and connecting them all to the internet has had very little if any impact on standards according to a study commissioned by the Department for Education. Despite... unprecedented levels of investment, it could find no consistent relationship between computer use and pupil achievement in any subject at any age.... One of the report's most striking findings was how little use secondary schools made of the 150 or so computers with which each is now equipped. The proportions of schools saying they never or hardly ever used computers in lessons for 14 year olds were 61% in English, 67% in maths and 82% in science' [15].

In interviews with teachers and teacher educators, the question of how to make PowerPoint presentations interesting, engaging and effective emerged as a problem that affected several subjects. Since the introduction of data projectors and interactive whiteboards, PowerPoint has become the dominant mode of presentation in UK schools. 'Death by PowerPoint' appeared to be a common affliction (for teachers as well as pupils), and in one school, a teacher who was interviewed reported that pupils in his school had drawn up a petition to the head, protesting about teachers' use of PowerPoint (is there anyone reading this who has not at some point been severely bored by a PowerPoint presentation?).

Other problems relating to the use of ICT which were commonly mentioned by the teachers interviewed and cited by researchers in the field of ICT and education were the tendency of learners to waste time browsing/searching the internet in a way which tended to sidestep rather than aid the challenge of learning [16], and overreliance on cutting and pasting substantial chunks of information from the internet without reading or understanding it, what Walsh has termed 'Encarta syndrome' [17].

Walsh also notes that the moves towards data projectors, interactive whiteboards and PowerPoint have led to an increase in teacher talk and didactic styles of teaching [18]. One history teacher talked of the ‘noise, clutter and irrelevance of much multimedia content... have they learned nothing from Google?’

In the UK, the development of ‘interactive’ online quizzes has been a feature of many website activities, using ‘quizmaster’ technology to enable pupils to mark it themselves, work out which questions they answered correctly, and have further attempts to ‘get it right’, before moving on. Together with ‘shockwave’ graphics, these offer a very attractive mode of testing for recall, compared to ‘pencil and paper’ testing, but they only work for straightforward retention and comprehension questions. The sort of interactivity involved in such exercises only addressing the lower ‘rungs’ of the learning hierarchy. Many of the teachers interviewed felt that in terms of their interaction with these materials, learners were often asked to do fairly low-level, meretricious or even pointless things with the information given. One languages teacher educator reported on a subject specific disadvantage or abuse of interactivity: ‘Unscrupulous use of translation engines such as Babelfish... pupils think of such sources as authoritative and it can harm their progress in translation.’

Against these negatives were a range of comments pointing to the potential of multimedia and interactivity for enhancing teaching and learning outcomes. In the words of one foreign languages teacher educator:

At the level of exposure to different experiences, the interactive potential of ICT opens up horizons and can take language learning to a different level... the range of accents they can encounter... video gives learners paralinguistic clues of facial expression together with the dimension of sound... compared to just listening, the multimedia dimension enables them to watch conversational interaction. You can’t model that if you are a “solo” teacher. Podcasts of weather forecasts etc can also provide more authentic exposure to the target language compared to text based resources such as the traditional text book.

A physical education teacher educator eulogised about the potential of video capture to provide enhanced feedback for learners on their technique, a maths teacher educator reported that some schools were using *Success Maker*, an integrated learning package for mathematics, in a way that improved both learners’ attitude to the subject, and their progress. A science teacher educator argued that ‘the multimedia and interactive dimensions of data logging equipment allow learners in science to spend more time on speculation and high-order thinking, improving the development of their grasp of scientific concepts’, and a history teacher claimed that departmental use of ICT had transformed pupils’ attitude to the subject (for the better). An English teacher educator argued that ‘the real or most valuable interactivity is that which derives from learners working collaboratively with each other, having been stimulated to do so by the potential of new technology to offer spontaneous feedback and a range of stimulus material in forms which were not previously available’, adding that ‘the audio dimension of multimedia means that they can hear poets reading their own work, this is a definite plus.’

The picture from the UK is not one of techno-failure, but of very uneven and patchy progress. One school inspector characterised this as ‘slow growth, a few green shoots’ [19]. There are some schools where ICT is making a major impact on pupil attainment and attitudes to learning across a range of subjects, and there are departments which are making inspirational use of new technology and developing archives of high impact materials and activities which are transforming the learning experiences of their pupils. What the UK has not yet managed to do is to find an effective mechanism for disseminating good practice and allowing communities of practice to share ideas and experiences.

#### 4. Conclusions

The interviews suggested that what teachers need more than anything is time to explore aspects of educational technology for themselves, and time to meet in subject related communities of practice to share ideas and learn from mistakes and experience, rather than more generic, industrial model training

in ICT. They need to experiment with how to make the use of multimedia powerful rather than distracting, and how to make the interactive functions of ICT meaningful rather than banal.

How to make PowerPoint presentations less boring, how to make best use of classroom voting technology, how to get learners to make mature and intelligent use of the internet are just some of the questions posed by ICT which are relevant to large numbers of teachers. In the words of a Vocational Subjects teacher educator, 'Yes there are problems of learners wasting time getting lost in cyberspace and using PowerPoint badly, but overall, for the intelligent and discerning teacher, the multimedia and interactive dimensions of new technology offer the potential to improve teaching and learning in a range of ways.' PowerPoint is not necessarily an educational anaesthetic, 'Yes, there are a lot of teachers using PowerPoint in a way that makes it difficult for learners to stay awake, but that is an agenda which needs to be developed... teachers can work on their pedagogic skills with PowerPoint... it is not *necessarily* boring' (Geography teacher educator). Making the most of new technology in education is not primarily about further technological advance, it is about improving the quality of instructional design, using multimedia and interactivity to make pupils think, and developing the pedagogical expertise of teachers in exploring the intriguing possibilities which new technology offers.

## References

- [1] G. Behre, Information Technology or History Textbooks - the survival of the fittest?, *Communications: Journal of the International Society for History Didactics*, **19**, 57 (1998).
- [2] T. Haydn, The use of ICT in history teaching in secondary schools in England and Wales 1970-2003, PhD thesis, University of London (2004).
- [3] S. Heppell, Power trips on the superhighway' *Observer*, 8 October (1995).
- [4] J. Redwood, *Times Educational Supplement*, 14 April. (1995).
- [5] T. Blair, A week in politics, *Channel 4*, 18 February (1995).
- [6] T. Haydn, *op. cit.*
- [7] G. Kress, Shapes of knowledge and potentials for learning: rhetorics of education in the environment of digital technologies, keynote address, EERA Conference, University of Geneva, 15 September (2005).
- [8] J. Taylor, *Technonerds*, *Channel 4*, 19 March. (1996).
- [9] C. Preston, Learning to use ICT in classrooms: teachers' and trainees' perspectives: an evaluation of the English NOF ICT teacher training programme, 1999-2003, London, Mirandinet/TTA (2004).
- [10] T. Haydn and R. Barton, Common needs and different agendas: how trainee teachers make progress in their ability to use ICT in subject teaching: some lessons from the UK, *Computers and Education*, in press, (2006).
- [11] C. Harrison *et al.*, *op.cit.*
- [12] D. Buckingham, *Schooling the digital generation*, Institute of Education, University of London, London (2005).
- [13] J. Nichol and K. Watson, Rhetoric and reality- the present and future of ICT in education, *British Journal of Educational Technology*, **34**, 1 (2003).
- [14] C. Harrison *et al.*, *op. cit.*
- [15] *Daily Telegraph*, Editorial, 10 January (2003).
- [16] A. Childs, What's special about the internet in science teaching, paper presented at the BERA Conference, Warwick, September (2006).
- [17] B. Walsh, Building Learning Packages: integrating virtual resources with the real world of teaching and learning, in T. Haydn and C. Counsell (eds), *History, ICT and Learning*, RoutledgeFalmer, London (2004), Chapter 4, 110-131.
- [18] B. Walsh, Beyond multiple choice, paper presented at the European History E-Learning Project (E-Help) seminar, Stockholm, 8 September (2006).
- [19] S. Harrison, Slow growth: a few green shoots, in T. Haydn and C. Counsell (eds), *History, ICT and Learning*, RoutledgeFalmer, London, (2004), Chapter 2, 41-57.